

CLAIMS

1. – 10. (Cancelled)

11. (New) An arrangement for speed-dependent pressure regulation of an oil control pump for pumping lubricating oil from an inlet space into a conveying pressure space and from there to an internal combustion engine, comprising

conveying capacity adjusting means for said lubricating oil supply;

a control piston for generating a control pressure to provide a pressure bias for said conveying capacity adjusting means;

means for applying an additional force that acts upon said control piston, said force applying means including

rotary means having a radial bore in communication with said lubricating oil so that said lubricating oil is subjected to the speed-dependent centrifugal pressure in said radial bore, and

a differential pressure piston having a first surface area biased by said lubricating oil under a first pressure influenced by said centrifugal pressure and a second surface area biased by said lubricating oil under a second pressure.

12. (New) Arrangement as claimed in claim 11, wherein said radial bore extends in the direction of centrifugal force.

13. (New) Arrangement as claimed in claim 11, wherein said radial bore is inclined to the direction of centrifugal force.

14. (New) Arrangement as claimed in claim 11, wherein said rotary means is a conveying wheel of said oil control pump.

15. (New) Arrangement as claimed in claim 11, further comprising pressure communication means for interconnecting said second surface area with said conveying pressure space so that said second pressure is the conveying pressure.

16. (New) Arrangement as claimed in claim 11, wherein said first surface area is in communication with the radial inner end of said radial bore so that first pressure is the conveying pressure reduced by said centrifugal pressure.

17. (New) Arrangement as claimed in claim 11, further comprising dampening means for dampening the movement of said differential pressure piston.

18. (New) Arrangement as claimed in claim 17, wherein said dampening means comprise throttle means for throttling the flow of said lubricating oil moved by said differential pressure piston.

19. (New) Arrangement as claimed in claim 18, wherein said throttle means comprise a throttle chamber, said differential pressure piston comprising a third surface area facing said throttle chamber.

20. (New) Arrangement as claimed in claim 11, further comprising pressure relief means communicating with said first surface area of said differential pressure piston.

21. (New) Arrangement as claimed in claim 20, wherein said pressure relief means comprise switching means.

22. (New) Arrangement as claimed in claim 20, wherein said pressure relief means comprise a solenoid valve.

23. (New) An arrangement for speed-dependent pressure regulation of an oil control pump for pumping lubricating oil into a conveying pressure space and from there to an internal combustion engine, comprising
conveying capacity adjusting means for said lubricating oil supply;
a control piston for generating a control pressure to provide a pressure bias for said conveying capacity adjusting means;
means for applying an additional force that acts upon said control piston, said force applying means including

rotary means having a radial bore in communication with said lubricating oil so that said lubricating oil is subject to the speed-dependent centrifugal pressure in said radial bore, and

a differential pressure piston having a first surface area biased by said lubricating oil under a first pressure influenced by said centrifugal pressure and a second surface area biased by said lubricating oil under a second pressure, said differential pressure piston being axially movable relative to said control piston; and

spring means acting onto said differential pressure piston and said control piston so that said differential pressure piston transfers said additional force to said control piston via said spring means.

24. (New) Arrangement as claimed in claim 23, wherein said spring means comprise a first and a second spring which bias said control piston in the same direction, said second spring means being interposed between said control piston and said differential pressure piston.

25. (New) An arrangement for speed-dependent pressure regulation of an oil control pump for pumping lubricating oil from an inlet space into a conveying pressure space and from there to an internal combustion engine, comprising

conveying capacity adjusting means for said lubricating oil supply;

a control piston for generating a control pressure to provide a pressure bias for said conveying capacity adjusting means, said control piston being housed by said conveying capacity adjusting means which prove a housing for it;

means for applying an additional force that acts upon said control piston, said force applying means including

rotary means having a radial bore in communication with said lubricating oil so that said lubricating oil is subjected to the speed-dependent centrifugal pressure in said radial bore, and

a differential pressure piston having a first surface area biased by said lubricating oil under a first pressure influenced by said centrifugal pressure and a second surface area biased by said lubricating oil under a second pressure.

26. (New) Arrangement as claimed in claim 25, further comprising pressure channel means interconnecting the interior of said housing with said conveying pressure space, and relief channel means interconnecting the interior of said housing with said inlet space, wherein said control piston comprises a control groove which in a middle control position overlaps slightly both said pressure channel means and said relief channel means.

27. (New) An arrangement for speed-dependent pressure regulation of an oil control pump for pumping lubricating oil from an inlet space into a conveying pressure space and from there to an internal combustion engine, comprising

conveying capacity adjusting means for said lubricating oil supply;

a control piston for generating a control pressure to provide a pressure bias for said conveying capacity adjusting means;

means for applying an additional force that acts upon said control piston, said force applying means including

a conveying wheel of said oil control pump for conveying said lubricating oil from said inlet space to said conveying pressure space, while imparting it a conveying pressure, said conveying wheel having a radial bore in communication with said lubricating oil so that said lubricating oil is subjected to the speed-dependent centrifugal pressure in said radial bore, and

a differential pressure piston having a first surface area biased by said lubricating oil under a first pressure influenced by said centrifugal pressure and a second surface area biased by said lubricating oil under a second pressure,

wherein said radial bore of said rotating conveying wheel communicates only in predetermined angular positions with said first surface area of said differential pressure piston.

28. (New) Arrangement as claimed in claim 27, further comprising stationary hollow bolt means for supporting said rotating conveying wheel, said hollow bolt means comprising a radial extending transverse channel leading from the periphery into the interior of said hollow bolt means, said radial bore of said conveying wheel, thus, communicating only in predetermined angular positions through said transverse channel with said first surface area of said differential pressure piston.

29. (New) Arrangement as claimed in claim 27, further comprising filter means for said lubricating oil when flowing to at least one of said first and second surface areas.

30. (New) Arrangement as claimed in claim 27, further comprising throttle means for said lubricating oil when flowing to at least one of said first and second surface areas.

31. (New) An arrangement for speed-dependent pressure regulation of an oil control pump for pumping lubricating oil from an inlet space into a conveying pressure space and from there to an internal combustion engine, comprising

 pump housing means;

 conveying capacity adjusting means for said lubricating oil supply, said conveying capacity adjusting means being displaceable as a displacement unit in said pump housing means;

 reset means for urging said displacement unit against the pressure of said conveying pressure space;

 a control piston for generating a control pressure to provide a pressure bias for said conveying capacity adjusting means;

 means for applying an additional force that acts upon said control piston, said force applying means including

 a conveying wheel of said oil control pump having external conveying teeth conveying lubricating oil from said inlet space to said conveying pressure space, while imparting it a conveying pressure, said conveying wheel having a radial bore in communication with said lubricating oil so that said lubricating oil is subjected to the speed-dependent centrifugal pressure in said radial bore, and

 a differential pressure piston having a first surface area biased by said lubricating oil under a first pressure influenced by said centrifugal pressure and a second surface area biased by said lubricating oil under a second pressure,

 said control piston and said differential pressure piston being housed within said displacement unit.

32. (New) Arrangement as claimed in claim 31, wherein said reset means comprise a reset spring arranged in a spring chamber of said displacement unit.

33. (New) Arrangement as claimed in claim 32, further comprising means for transferring said control pressure from said control piston to said chamber so as to bias additionally said displacement unit.

34. (New) Arrangement as claimed in claim 33, wherein said means for transferring said control pressure comprise a pressure pipe within said displacement unit, wherein said pressure pipe orifices out of said displacement unit into said spring chamber.

35. (New) Arrangement as claimed in claim 34, wherein said control piston is annular and is effecting its control movement along said pressure pipe.

36. (New) Arrangement as claimed in claim 32, wherein said means for applying an additional force comprises supply means for introducing oil under additional pressure as into said spring chamber.

37. (New) Arrangement as claimed in claim 36, wherein supply means comprise conduit means in said pump housing means which lead to said spring chamber, and valve means in said conduit means for controlling the supply of said additional pressure.

38. (New) Arrangement as claimed in claim 37, wherein said valve means comprise a solenoid valve.

39. (New) Arrangement as claimed in claim 36, further comprising pressure relief means communicating with said spring chamber.

40. (New) An arrangement for speed-dependent pressure regulation of an oil control pump for pumping lubricating oil from an inlet space into a conveying pressure space and from there to an internal combustion engine, comprising

- pump housing means;
- conveying capacity adjusting means for said lubricating oil supply;
- a control piston for generating a control pressure to provide a pressure bias for said conveying capacity adjusting means, said control piston including a control surface area exposed to said conveying pressure;

means for applying an additional force that acts upon said control piston, said force applying means including

rotary means having a radial bore in communication with said lubricating oil so that said lubricating oil is subjected to the speed-dependent centrifugal pressure in said radial bore, and

a differential pressure piston having a first surface area biased by said lubricating oil under a first pressure influenced by said centrifugal pressure and a second surface area biased by said lubricating oil under a second pressure.

41. (New) Arrangement as claimed in claim 40, wherein said conveying capacity adjusting means are displaceable as a displacement unit in said pump housing means and comprise a unit surface area exposed to said conveying pressure.

42. (New) Arrangement as claimed in claim 40, further comprising interrupting means for interrupting said speed-dependent pressure regulation.

43. (New) Arrangement as claimed in claim 42, wherein said interrupting means comprise valve means for interrupting said conveying pressure to be active onto said control surface area.

44. (New) Arrangement as claimed in claim 43, wherein said valve means comprise a solenoid valve.